

The background is a dark blue gradient. On the left, there is a complex, multi-faceted geometric structure resembling a crystal or a complex polyhedron. From the right side of this structure, a broad, horizontal rainbow spectrum of light extends across the frame. The colors transition from purple on the left to red, orange, yellow, green, and blue on the right. The overall effect is one of scientific precision and aesthetic beauty.

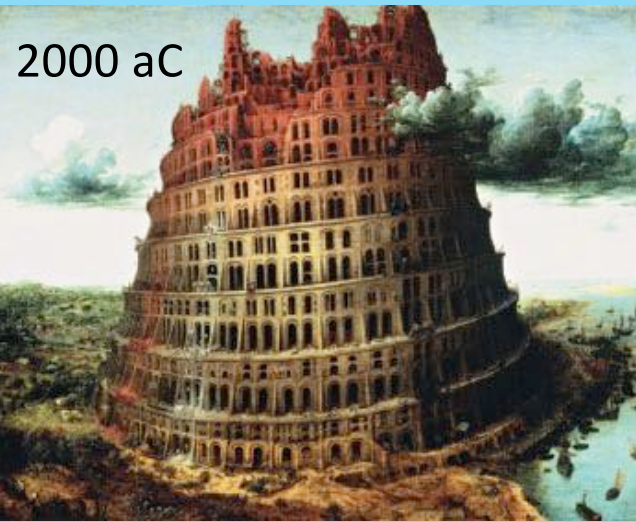
Física: a fronteira final

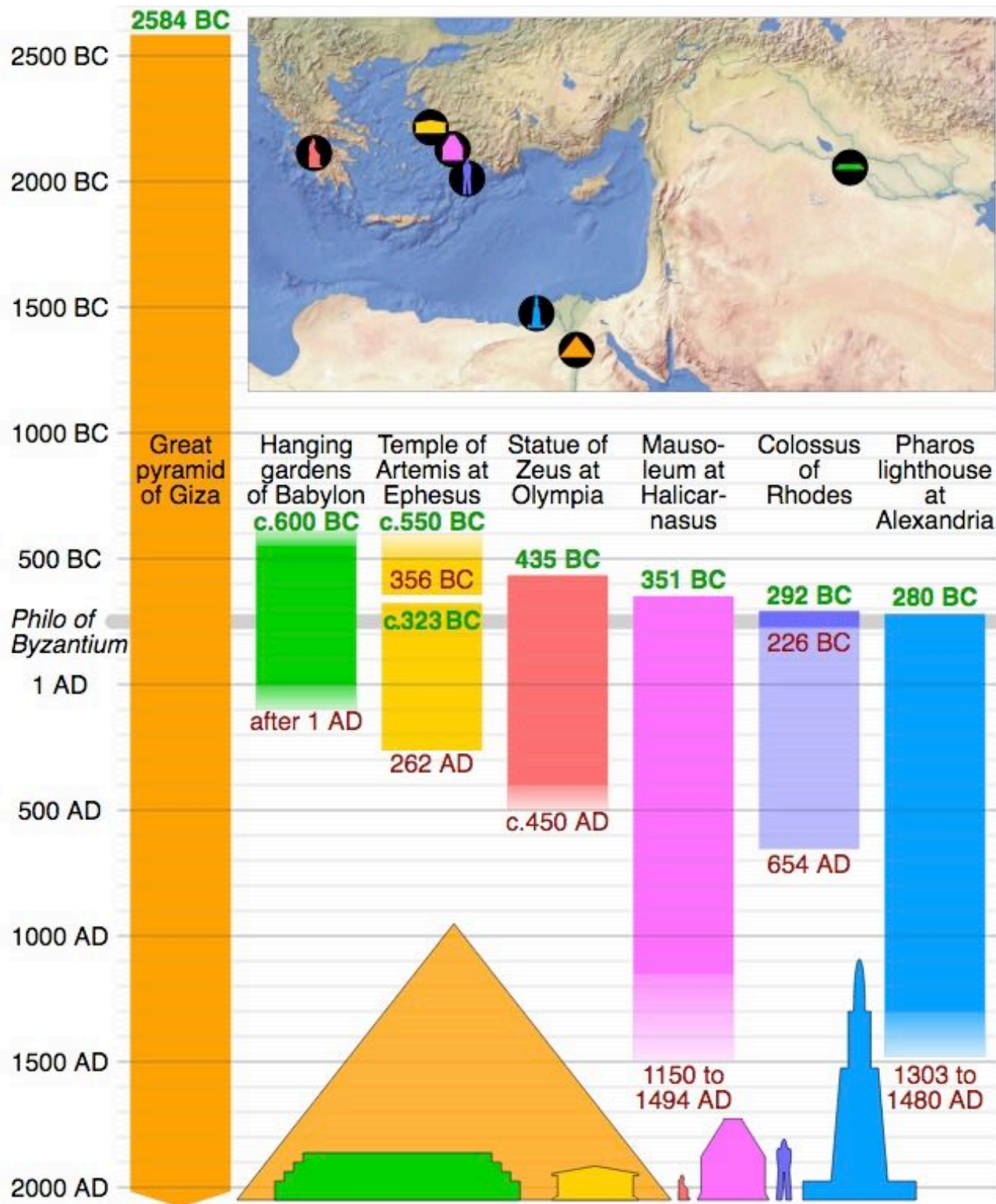
Prof. Simões

Ao final
dessa aula,
você

- Terá uma visão histórica do desenvolvimento da Física
- Saberá a importância do pensamento grego na Física
- Aprenderá sobre a Física na Idade Média
- Verá a importância dos desenvolvimentos no Renascimento
- Entenderá o que é o Método Científico
- Identificará a diferença entre Física Clássica e Física Moderna
- Saberá da importância da Matemática na Física
- Entenderá os limites e desafios atuais da Física

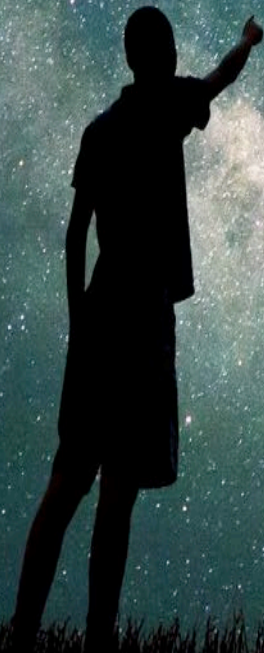
Antigas civilizações





As Sete Maravilhas do Mundo Antigo exigiram consideráveis conhecimentos de Física, embora ainda empíricos

A pergunta que fez nascer a
Física: como o universo
funciona?

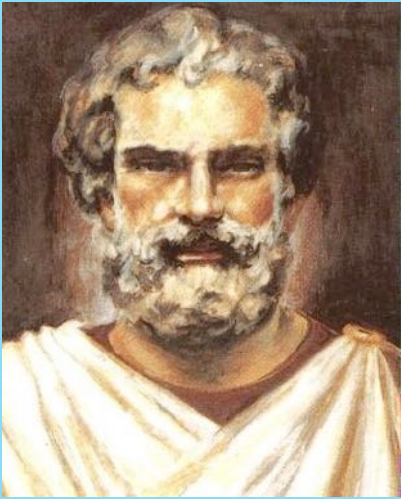


O pensamento grego

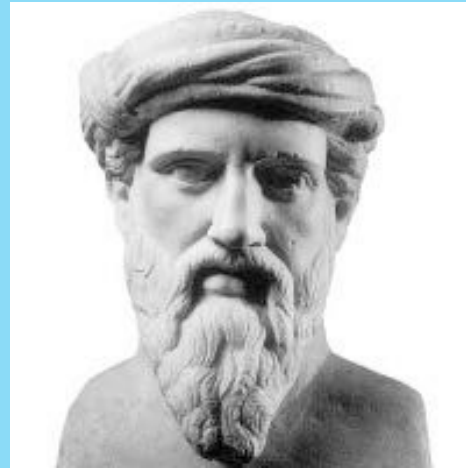


[Link para a apresentação](#)

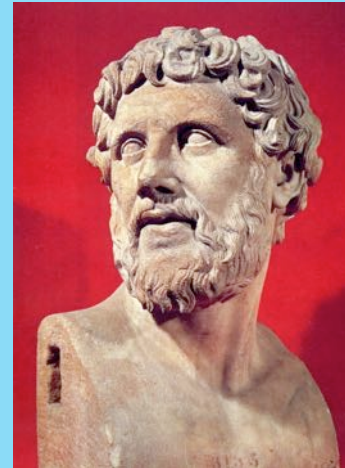
Idade Antiga – Aprox. 4000 aC até 476 dC (queda de Roma)



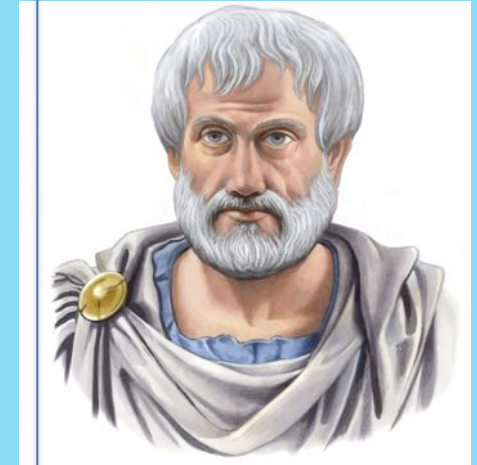
Tales



Pitágoras



Demócrito



Aristóteles

Pré-socráticos, antes de 399 aC.



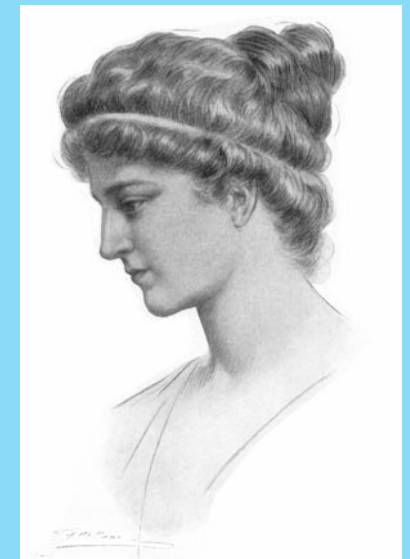
Ptolomeu



Euclides



Arquimedes



Hipácia

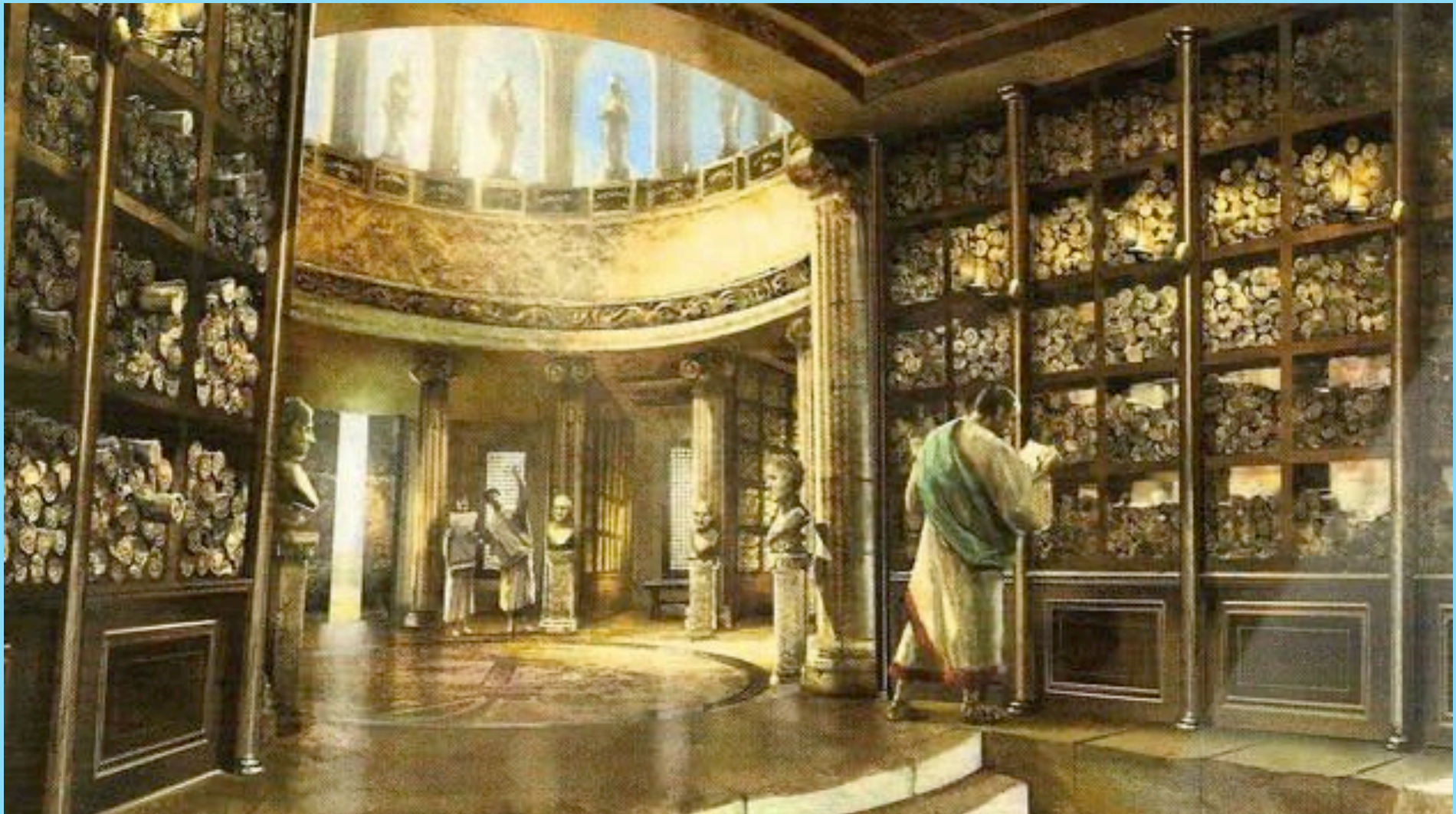
Alexandria, centro cultural do mundo antigo



Farol de Alexandria, uma das sete maravilhas

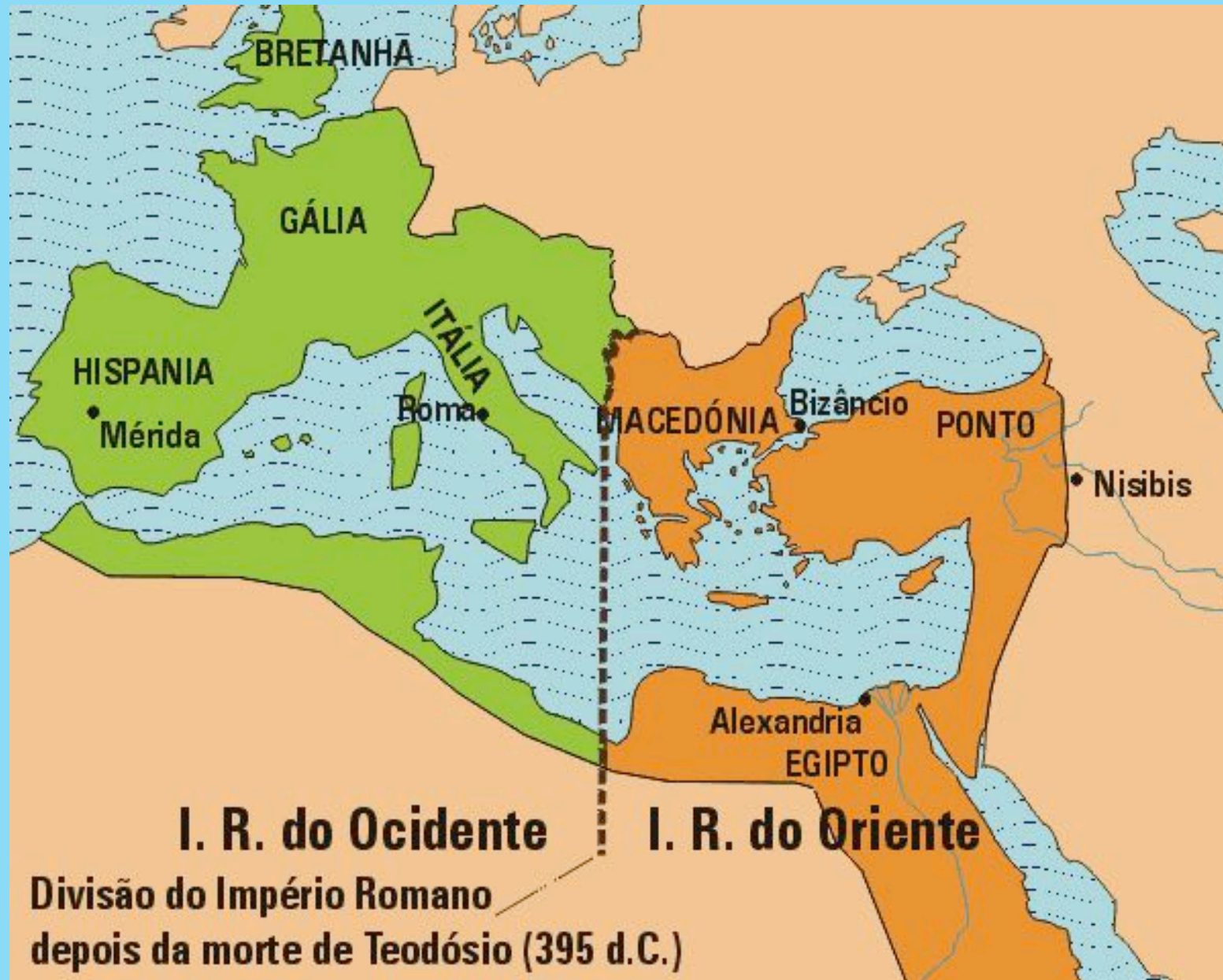


Biblioteca de Alexandria



A **Biblioteca de Alexandria** foi fundada no século III a.C. e esteve em funcionamento por seiscentos anos, sendo destruída definitivamente entre os anos de 250 a 270. Chegou a ter entre 500 mil e 1 milhão de livros.

Fim o império Romano: início da Idade Média



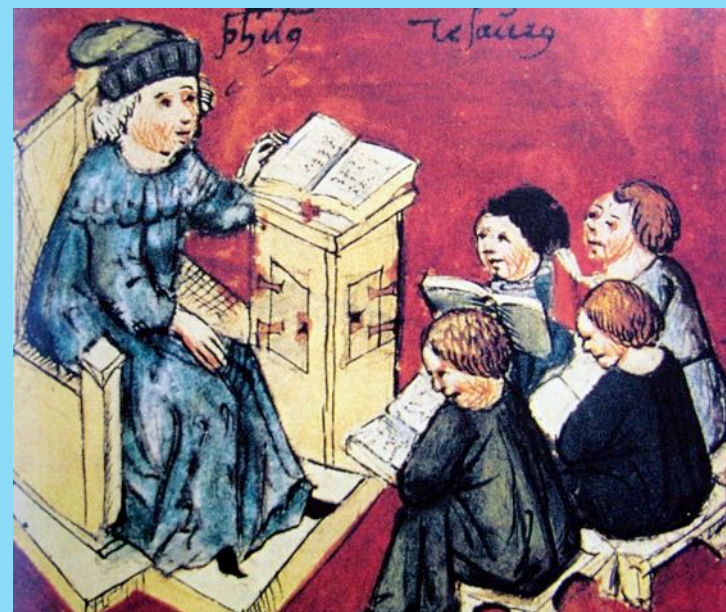
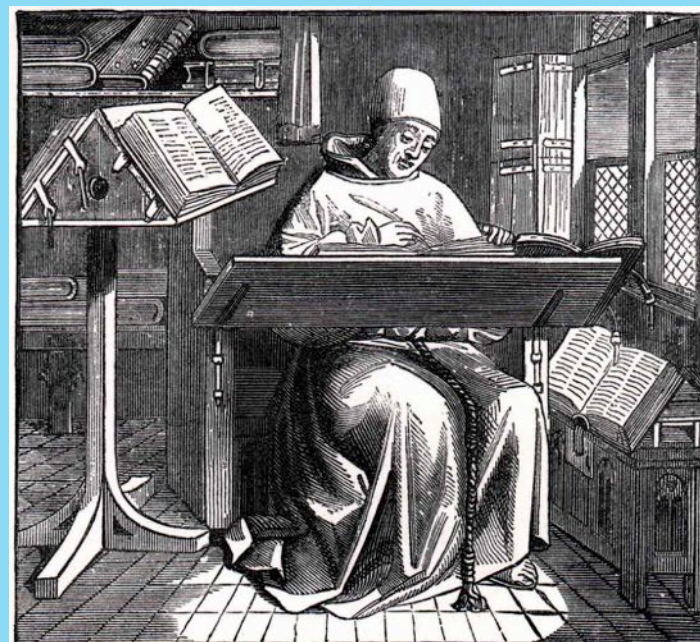
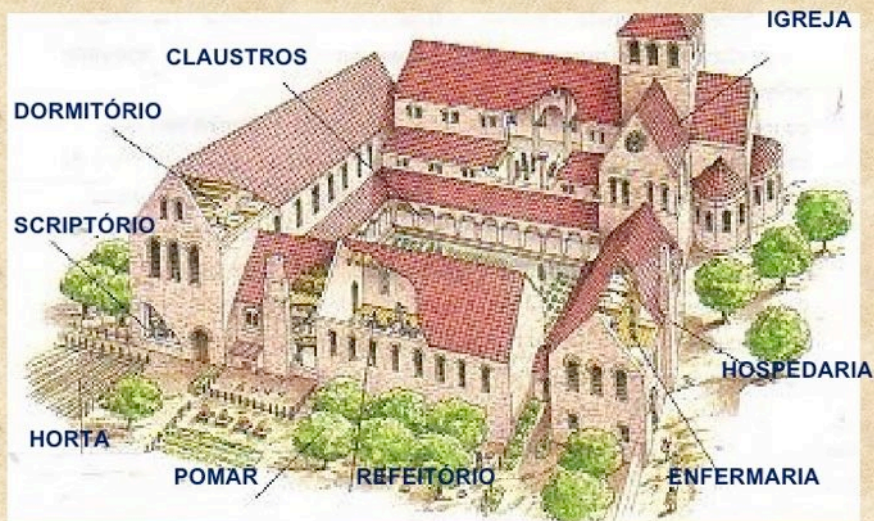
Queda de Roma, 476 d.C.



Karl Pawlowitsch Brjullow, 1799–1852

Idade Média – 476 a 1453 (queda de Constantinopla)

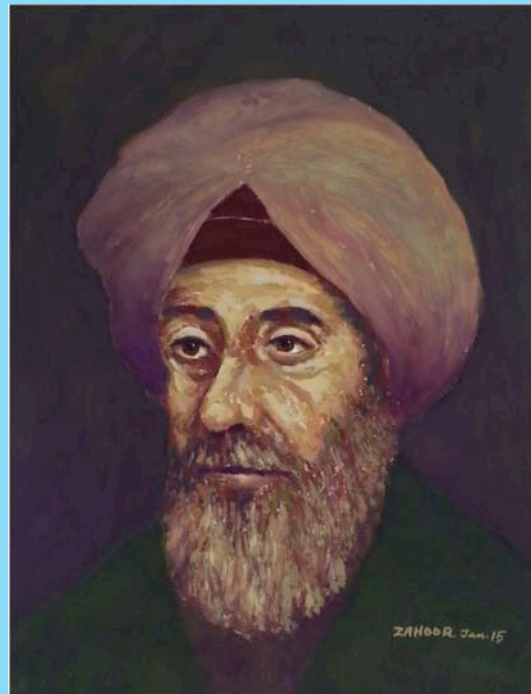
UM MOSTEIRO NA IDADE MÉDIA



Desenvolvimentos no mundo indo-arábico



Avicena (980-1037)



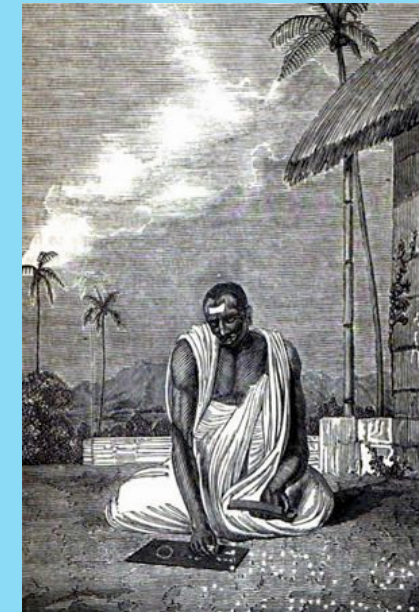
Alcuarismi (780-850)



Alhazém
(965-1040)

Averróis
(1126-1198)

Brahmagupta
(598-668)



Renascimento, séc. XIV e XV

O Sepultamento de Cristo, 1250



A Lamentação de Cristo (frag.)
Giotto, 1350

Renascimento

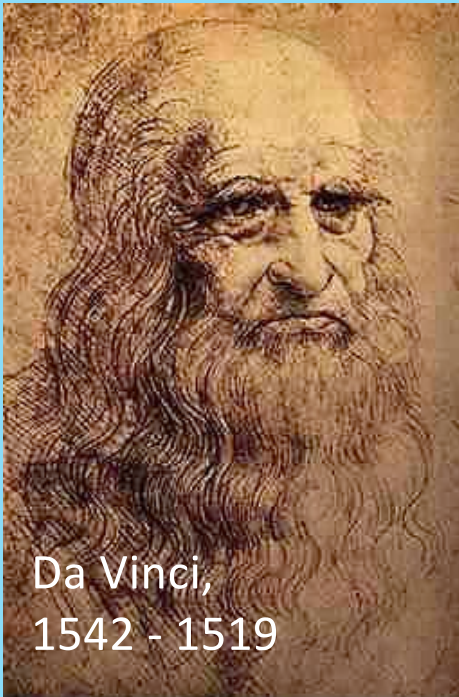
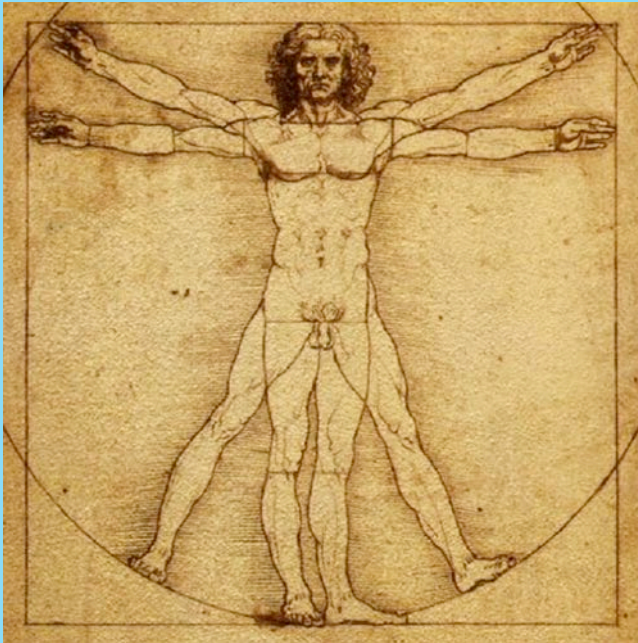




Rafael
Sanzio,
1510



Renascimento



Da Vinci,
1542 - 1519

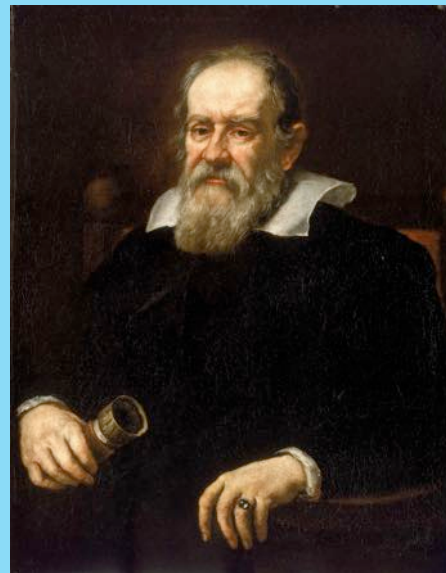


Boticelli,
1493

Idade Moderna – 1453 a 1789 (revolução francesa)



Copérnico
(1473-1543)



Galileu Galilei
(1564-1642)

Rene
Descartes
(1596-1650)



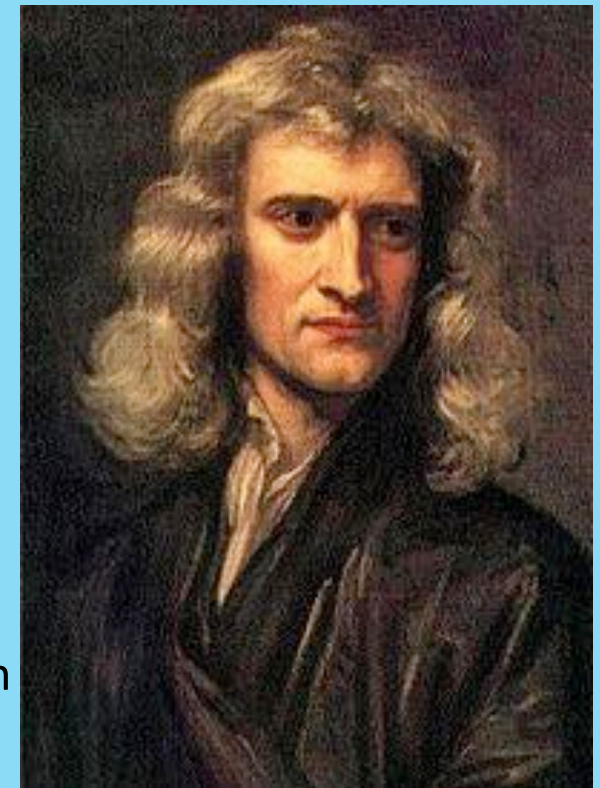
Tycho Brahe
(1546-1601)



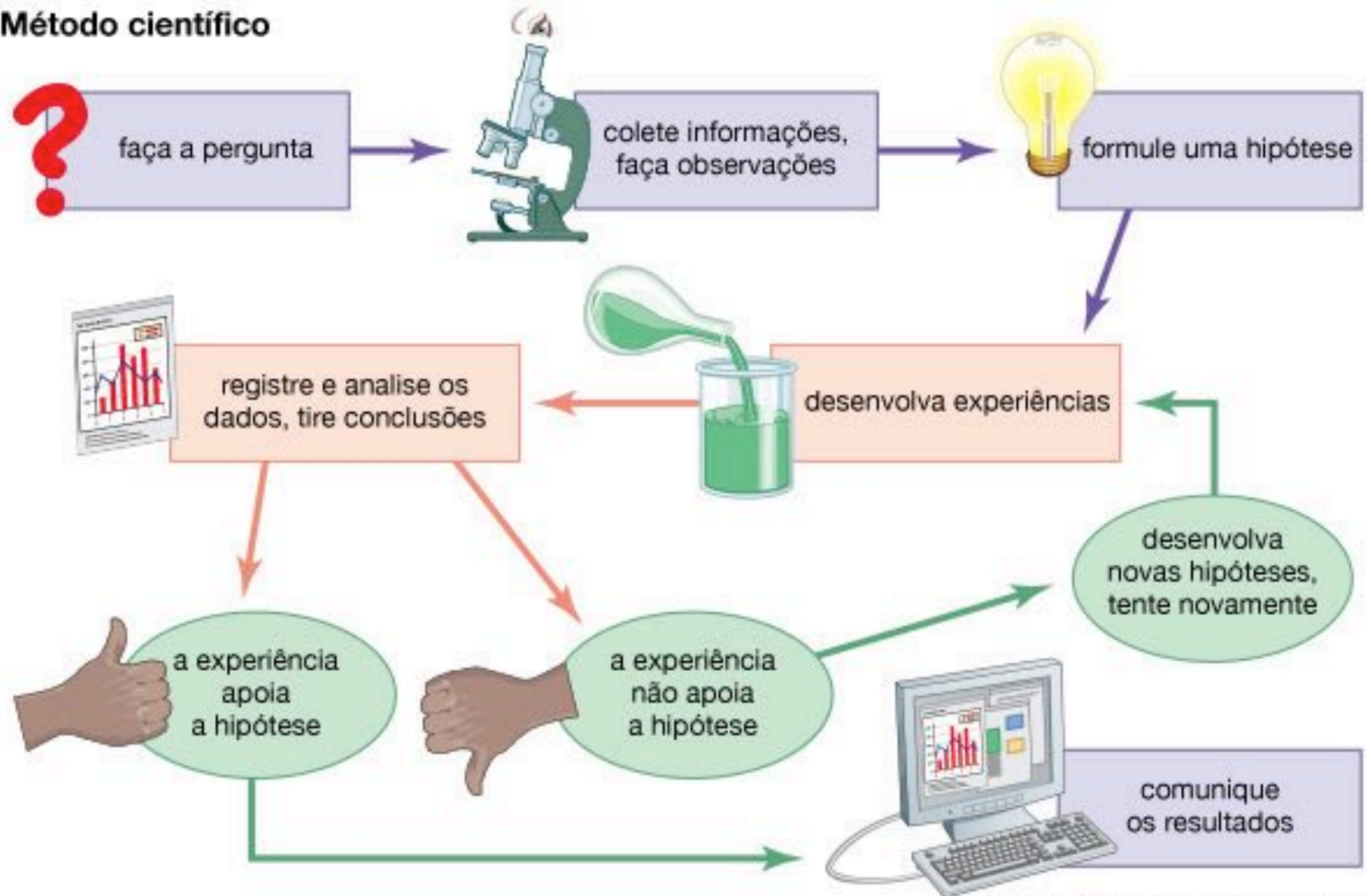
Johannes Kepler
(1571-1630)



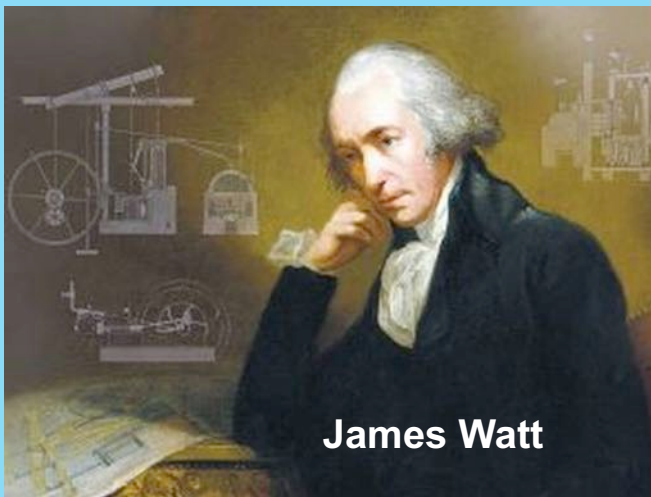
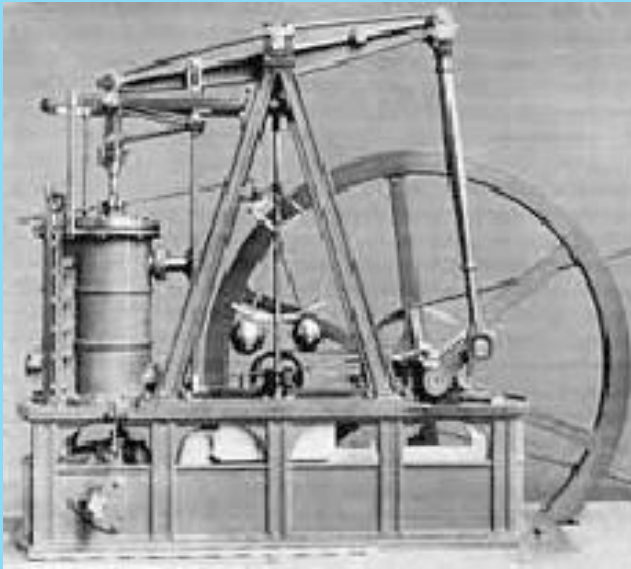
Isaac Newton
(1643-1727)



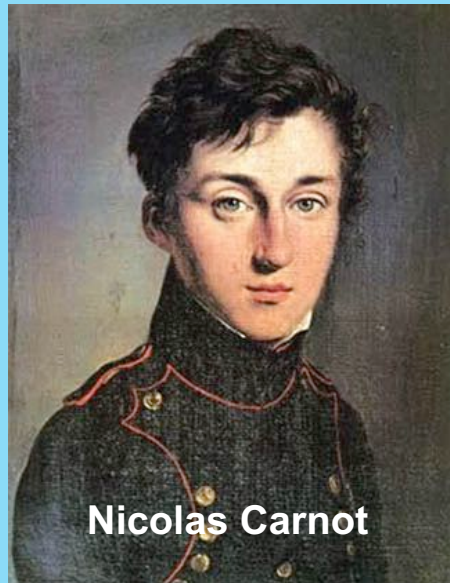
Método científico



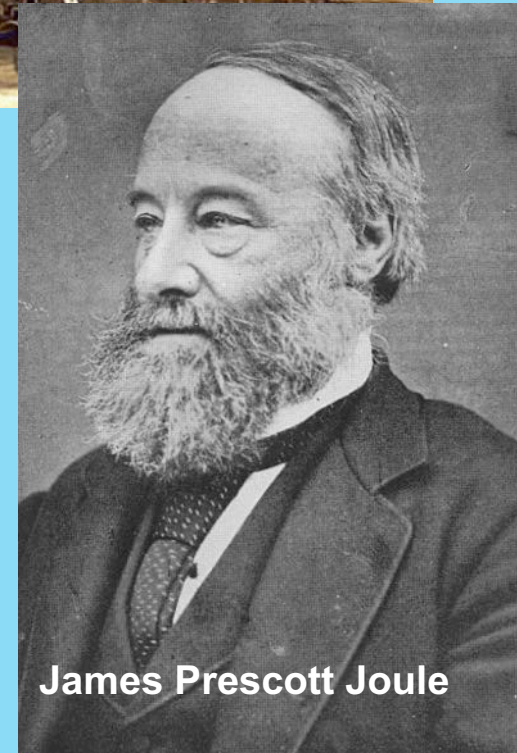
A Revolução Industrial e o estudo do calor (séc. XIX)



James Watt

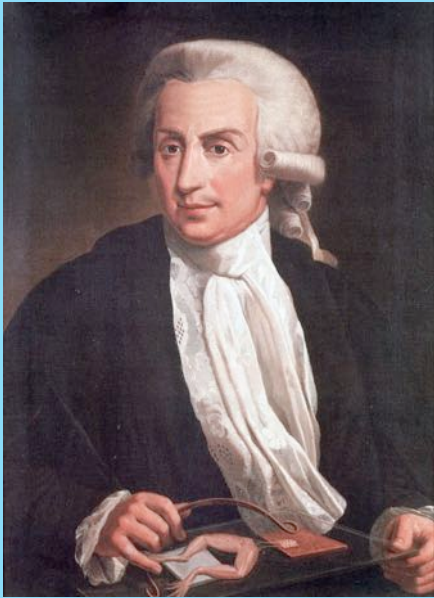


Nicolas Carnot

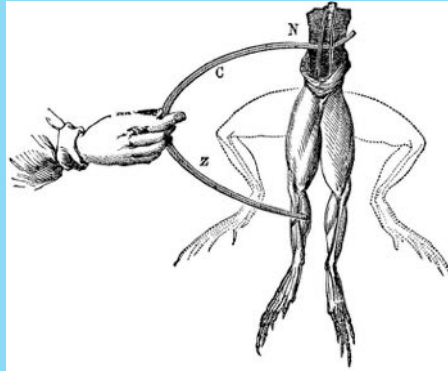


James Prescott Joule

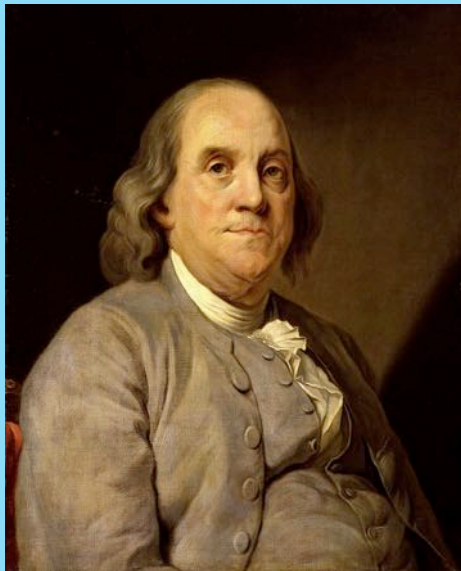
Desenvolvimentos na eletricidade (séc. XVIII e XIX)



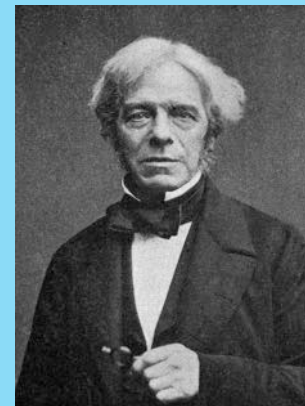
Luigi Galvani



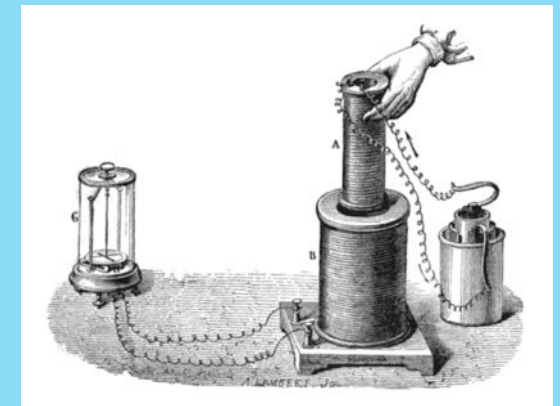
Christian Oersted



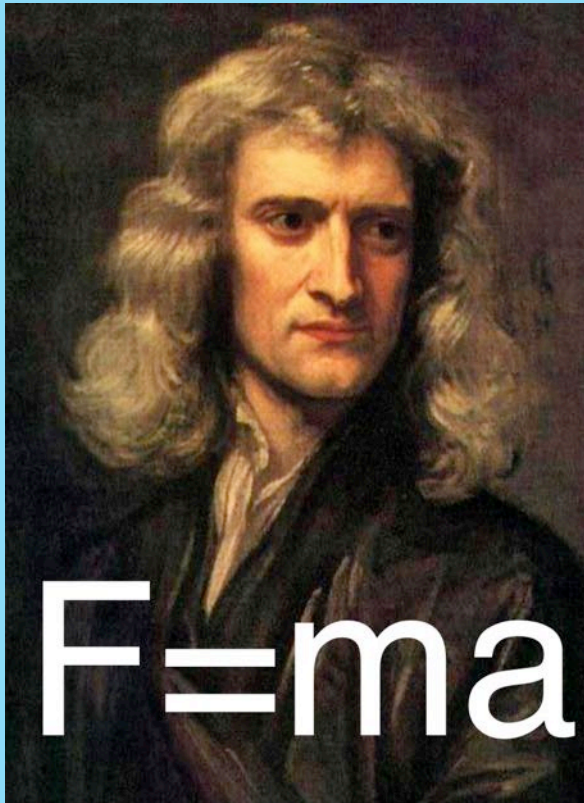
Benjamin Franklin



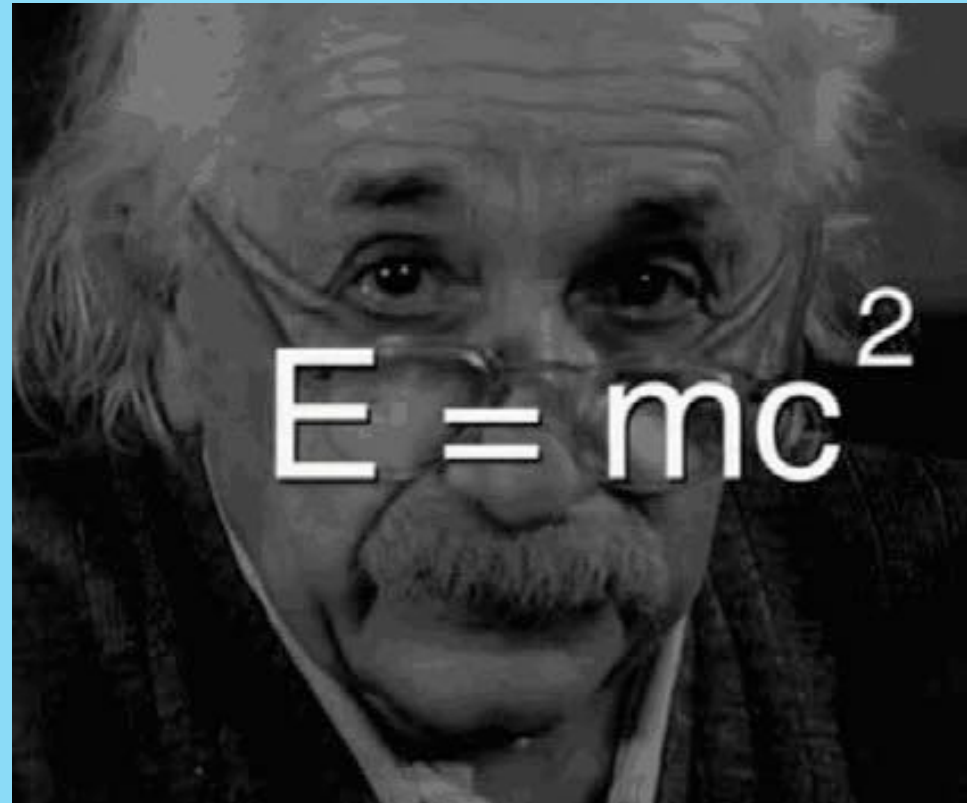
Michael Faraday



Física Clássica x Física Moderna



- Mecânica
- Termodinâmica
- Eletromagnetismo



- Física atômica
- Relatividade
- Mecânica Quântica



A Física é uma ciência
experimental

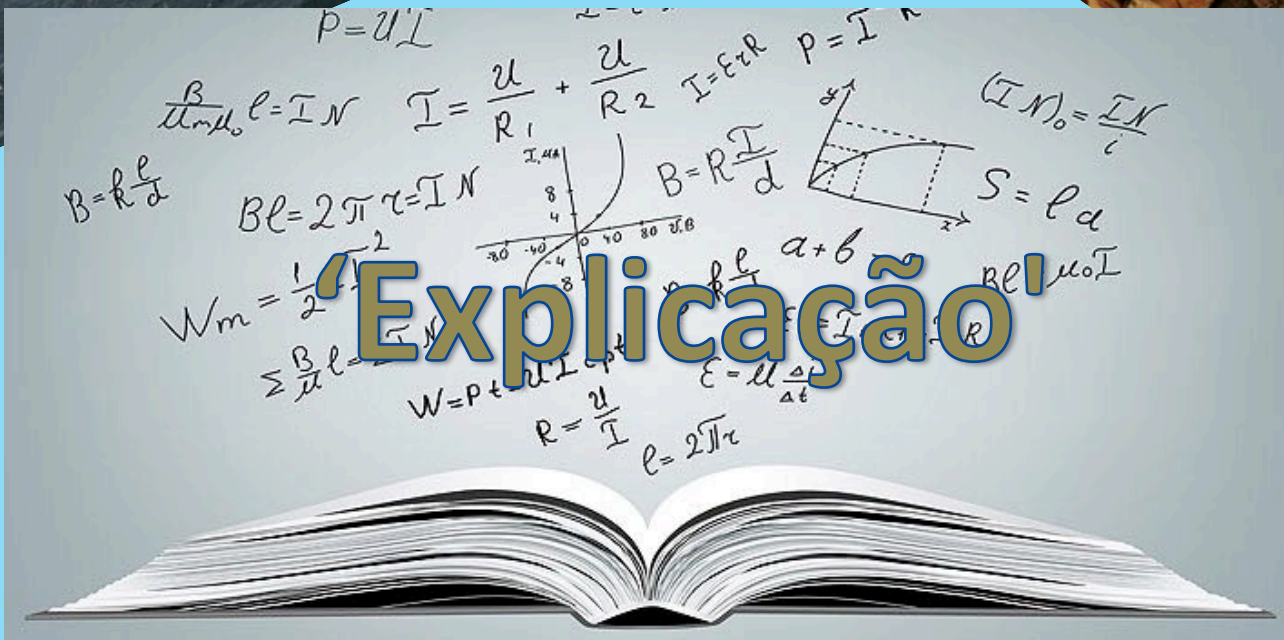


Fenômeno



Padrões

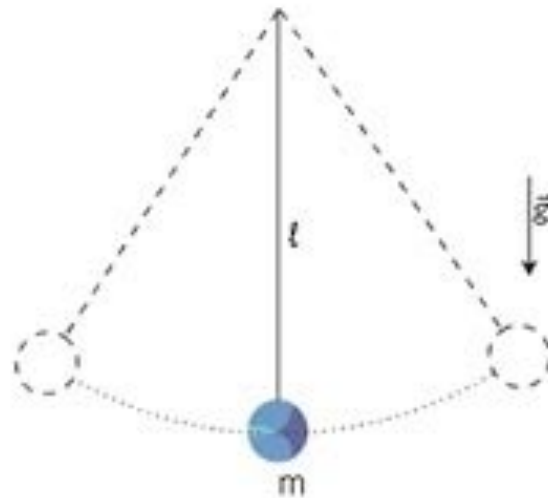
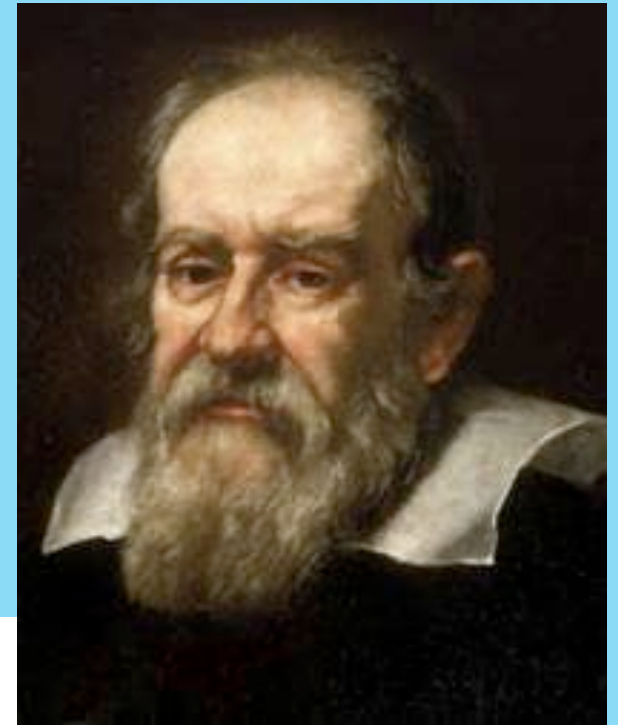
masca eterna



$P = UI$
 $\frac{B}{\mu_0 \mu_r} l = IN$ $I = \frac{U}{R_1} + \frac{U}{R_2}$ $I = E \cdot R$ $P = I^2 R$
 $B = R \frac{I}{d}$ $(IN)_o = \frac{IN}{i}$
 $S = l \cdot d$
 $W_m = \frac{1}{2} L I^2$ $W = Pt$ $R = \frac{U}{I}$ $l = 2\pi r$
 $\sum \frac{B}{\mu} l = \dots$ $E = -U \frac{\Delta \phi}{\Delta t}$
 $a + b$ $BL \mu_0 I$
 $R = \frac{U}{I}$ $l = 2\pi r$

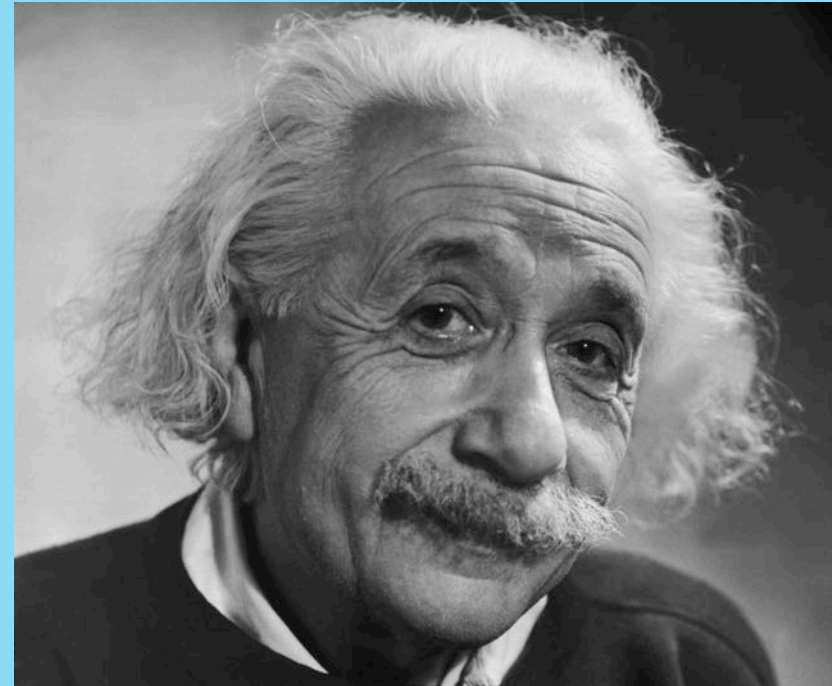
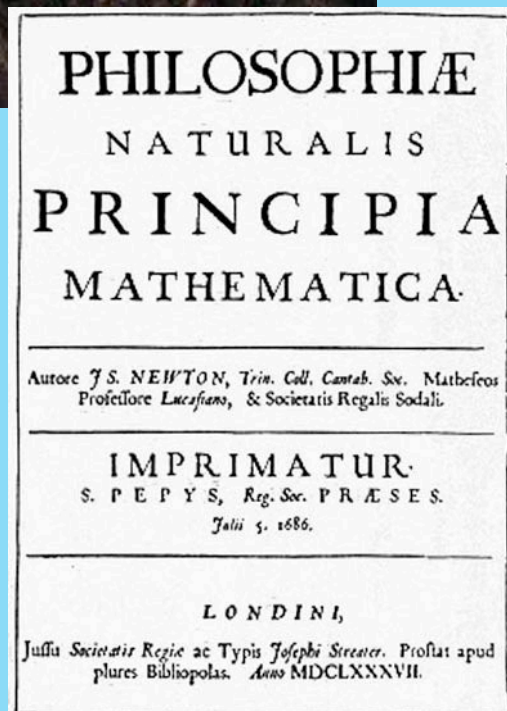
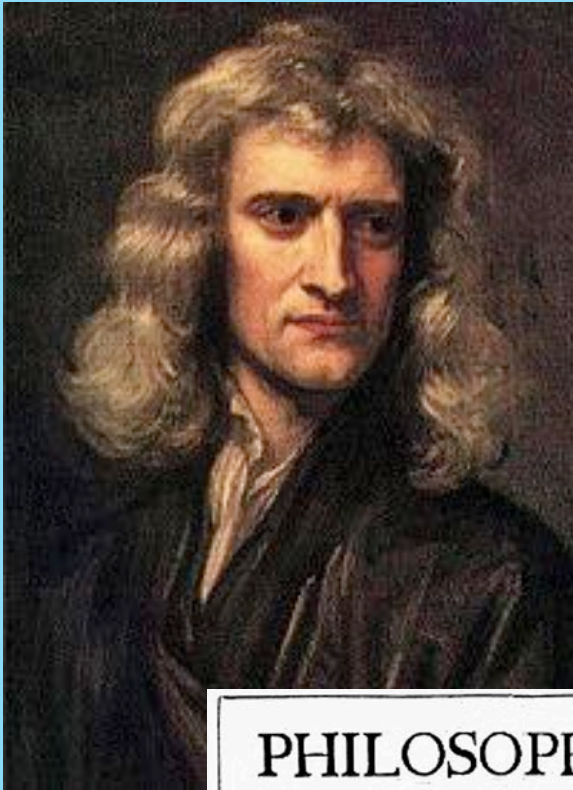
Explicação

Modelos



$$T = 2\pi \sqrt{\frac{l}{g}}$$

Física e Matemática



"Há um enigma que em todas as épocas agitou as mentes curiosas. Como pode a matemática, afinal um produto do pensamento humano que é independente da experiência, ser tão admiravelmente apropriada aos objetos da realidade?" — Albert Einstein, em *Geometry and Experience* (1921).

Física



Clásica

Moderna

Teoria do
campo
unificado



Quantum



relatividade

E pergunta que fez nascer a Física — como o universo funciona? — continua sendo respondida...

